

Name _____

Period 1 2 3

Review Sheet for Pre-AP Chemistry First Semester Final

Refer to your class notes, worksheets, and the textbook to complete this review sheet. Study early so that you will have time to ask questions about what you don't understand. **Do not forget to use your old Tests to also help you review for your semester final.** Most topic on the final are covered in the review sheet.

This must be completed in order to take the final

PERIODIC CHART OF THE ELEMENTS																		INERT GASES			
IA	IIA	IIIB	IVB	VB	VIB	VIIIB	VIII	IB	IIB	IIIA	IVA	VA	VIA	VIIA							
1 H 1.00797															1 H 1.00797	2 He 4.0026					
3 Li 6.939	4 Be 9.0122															5 B 10.811	6 C 12.0112	7 N 14.0067	8 O 15.9994	9 F 18.9984	10 Ne 20.183
11 Na 22.9898	12 Mg 24.312															13 Al 26.9815	14 Si 28.086	15 P 30.9738	16 S 32.064	17 Cl 35.453	18 Ar 39.948
19 K 39.102	20 Ca 40.08	21 Sc 44.956	22 Ti 47.90	23 V 50.942	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.71	29 Cu 63.54	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.909	36 Kr 83.80				
37 Rb 85.47	38 Sr 87.62	39 Y 88.905	40 Zr 91.22	41 Nb 92.906	42 Mo 95.94	43 Tc (99)	44 Ru 101.07	45 Rh 102.905	46 Pd 106.4	47 Ag 107.870	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.904	54 Xe 131.30				
55 Cs 132.905	56 Ba 137.34	57 La 138.91	72 Hf 178.49	73 Ta 180.948	74 W 183.85	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.09	79 Au 196.967	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.980	84 Po (210)	85 At (210)	86 Rn (222)				
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (268)	108 Hs (265)	109 Mt (266)	110 ? (271)	111 ? (272)	112 ? (277)										

Numbers in parenthesis are mass numbers of most stable or most common isotope.

Atomic weights corrected to conform to the 1963 values of the Commission on Atomic Weights.

The group designations used here are the former Chemical Abstract Service numbers.

* Lanthanide Series

58 Ce 140.12	59 Pr 140.907	60 Nd 144.24	61 Pm (147)	62 Sm 150.35	63 Eu 151.96	64 Gd 157.25	65 Tb 158.924	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.97
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† Actinide Series

90 Th 232.038	91 Pa (231)	92 U 238.03	93 Np (237)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (249)	99 Es (254)	100 Fm (253)	101 Md (256)	102 No (256)	103 Lr (257)
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1⁻ Charge

NO ₃ ¹⁻	nitrate
NO ₂ ¹⁻	nitrite
OH ¹⁻	hydroxide
CN ¹⁻	cyanide
C ₂ H ₃ O ₂ ¹⁻	acetate
HCO ₃ ¹⁻	bicarbonate
ClO ¹⁻	hypochlorite
SCN ¹⁻	thiocyanate
ClO ₃ ¹⁻	chlorate

2⁻ Charge

O ²⁻	oxide
S ²⁻	sulfide
SO ₄ ²⁻	sulfate
SO ₃ ²⁻	sulfite
CO ₃ ²⁻	carbonate
CrO ₄ ²⁻	chromate

3⁻ Charge

PO ₄ ³⁻	phosphate
P ³⁻	phosphide
N ³⁻	nitride

Density = mass/ volume 1ml = 1cm³ density of water = 1g/ml
 Average atomic mass = $\Sigma(\text{mass of isotope} \times \text{relative abundance})$
 $E = h \cdot v$ $c = v \cdot \lambda$ $E = h \cdot c/\lambda$
 $h = 6.63 \times 10^{-34} \text{ Js}$ $c = 3.0 \times 10^8 \text{ m/s}$
 grams/ mol = amu

Matter: Anything that takes up space and has mass

Physical Changes and Chemical Changes

1. Define each. How can you tell the difference between the two?

Atom

2. For this Carbon-14 isotope, $^{14}_6\text{C}$

- Atomic number = _____, Mass number = _____,
- # of protons = _____, # of electrons = _____, # of neutrons = _____.

3. Atomic Masses: What is the difference between the mass number for Carbon-14 and carbon's atomic mass of 12.011 amu?

4. Calculate the atomic mass of lithium if one isotope has a mass of 6.0151 amu and a percent abundance of 7.59% and a second isotope has a mass of 7.0060 amu and a percent abundance of 92.41%.

Atomic Models:

5. Philosophers: Democritus (believed in atoms) and Aristotle (didn't believe in atoms)

Scientists: What was the contribution of each one's atomic model? Draw a model of each.

John Dalton

List the four postulates of Dalton's Atomic Theory:

J.J. Thompson

~~Earnest Rutherford~~

~~Quantum mechanical model (Werner Heisenberg):~~

- ~~▪ Energy levels (n=1, 2, 3, 4,...) represented by periods on the periodic table~~
- ~~▪ Sublevels: (s, p, d, f) represented by blocks on the periodic table~~
- ~~▪ Orbitals—region of space where up to 2 electrons may be found~~

6. What are the long hand and short hand configurations for the following atoms:

i) Mg

ii) P

iii) Br

7. Characteristics of subatomic particles

Particle	Mass	Charge	Location in atom
Proton			
Neutron			
Electron			

Periodic trends

8. Locate or define parts of the periodic table:

a) Groups

b) Periods

c) Transition metals (d & f blocks) vs. Representative Elements (s & p blocks)

d) Alkali metals, Alkaline Earth metals, Halogens, Noble Gases

9. What are the first 18 elements on the periodic table?

10. What are the trends for...

a) electronegativity

b) atomic radii

11. a) Elements in the same _____ have similar physical and chemical characteristics because they have the same number of _____.
(group, period)
(atoms, protons, neutrons, electrons, valence electrons)

12. From their positions on the periodic table, what charges would the ions of Be and N have?

	Gains or loses electrons?	Symbol for ion		Gains or loses electrons?	Symbol for ion
Be			N		

13.

a) What is the electromagnetic spectrum from shortest to longest wavelength?

b) What type of electromagnetic radiation has a wavelength of $10 \times 10^{-10} \text{ m}$?

c) What is the frequency of a beam of photons with a wavelength of 330nm?

d) What amount of energy is produced by a 340nm wavelength of light?

14. Properties of Metals vs. Nonmetals vs. Metalloids

Ionic vs. Molecular Compounds:

15. Ionic bonds are formed when a _____ and a _____ combine.

16. Metals lose electrons and form _____ while nonmetals gain electrons and form _____.

17. Molecular compounds form when a _____ and a _____ combine as they share electrons.

18. Identify the following pairs of atoms as potentially forming an ionic or molecular compound:

Mg and Cl _____ I and F _____ P and Cl _____

Ag and S _____ K and Br _____ Sn and O _____

Naming Covalent/ Molecular and Ionic Compounds

19. Naming covalent molecular compounds

Name: N_2O : _____ and NO_2 _____

20. Naming Ionic Compounds

a. Name: Li_2O _____ and $(\text{NH}_4)_2\text{SO}_4$ _____

b. Name: FeO _____ and $\text{Sn}_3(\text{PO}_4)_4$ _____

c. Name: NaHCO_3 _____ and CuCl_2 _____

Formulas of Molecular and Ionic Compounds

21. Write formulas for the following molecular compounds:

Phosphorous trihydride _____ dioxygen difluoride _____

Lead (II) hydroxide _____ chromium (III) sulfate _____

22. Write formulas for:

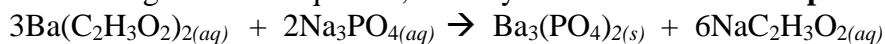
Ba^{2+} with OH^- _____ Iron (III) Sulfide _____

Na^+ with OH^- _____ NH_4^+ with PO_4^{3-} _____ Magnesium Sulfite _____

Chemical Reactions

23. Define what is meant by the term *chemical reaction* and describe the parts.

24. In the following chemical equation, identify the **reactants** and the **products**.

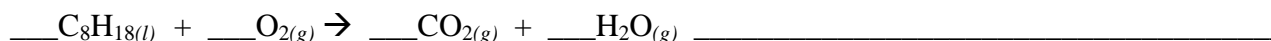
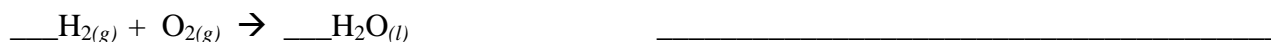
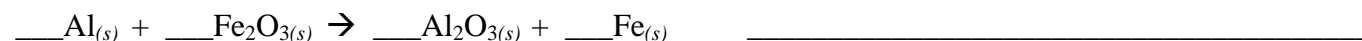


In the above chemical equation, what do the symbols (*aq*) and (*s*) stand for? What would the symbols (*l*) and (*g*) stand for in a chemical equation?

25. Chemical reactions can often be classified as one of five types. Write the general form for each type of reaction.

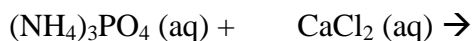
- a) Synthesis
- b) Decomposition
- c) Single-Replacement
- d) Double-Replacement
- e) Combustion

26. Using the five types of reactions listed above, classify **AND balance** the following equations:



Predicting Products:

27. Predict the products of the following reactions **AND** balance.



Net ionic equations:

28. Write the complete molecular equations and the net ionic equations

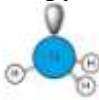
a. sodium phosphate reacts with ruthenium(VI) nitrate

b. Mercury (I) Nitrate reacts with Calcium Chloride

Molecular Geometry

29.

Complete the following table for Molecular Geometry..

Total e- pairs	Shared Pairs	Unshared Pairs	Molecular shape and name (Draw out)	Example
2		0		
				GaF_3
	2	1		
		0		CH_4
			Trigonal pyramidal 	
				H_2O